which exists in the three towns is bound to render one common organisation so cumbersome that it would necessarily check the freedom of development which is essential to success. Speaking for Manchester alone, does it need further argument that a more effective university may be formed by a close cooperation between Owens College, the Municipal School of Technology, the School of Art, the College of Music, and the various theological colleges, than is possible with the present federation, which is confined to Owens College alone? And is it not obvious that the interest in higher education which would be roused by the common feeling of the governing bodies of all these institutions for a great university in Manchester will more effectively secure a high standard of work and a progressive spirit, than the artificial union of three colleges in different towns? In our effort to secure educational freedom we count on the sympathy of all who are truly anxious for educational progress, and we count more especially on the help of those who are now working out a similar problem in the University of London.

ARTHUR SCHUSTER.

NOTES.

WE regret to see the announcement of the death of M. H. Faye, the eminent French astronomer, at the age of eighty-eight years.

DR. J. G. GARSON has been appointed assistant general secretary of the British Association, in succession to the late Mr. G. Griffith.

SPECIMENS of volcanic dust collected in St. Vincent and Martinique, during the recent eruptions, which have been placed by the Colonial Office at the disposal of the Board of Education, are exhibited in the Western Galleries of the Victoria and Albert Museum. To this exhibit there has been added some dust which fell in Barbados, with chemical analyses of the same, and drawings of the minerals which it contains.

THE United States Congress has amended the law which provided for the opening of the Universal Exposition at St. Louis, May 1, 1903, by deferring it for one year. This has been done for many reasons, the principal being that, since its inception, the scope of the exhibition has enlarged. Up to the middle of June the money available for the exhibition, including State and national appropriations, amounted to more than 4,000,000*l.*

A CORRESPONDENT sends us a cutting from the *Manchester Guardian*, announcing that Mr. Assheton Smith has consented to present to the University College of North Wales a site on the Menai Straits for the erection of a marine zoological station. A special fund for the erection of this station is being started, and already Mr. H. R. Davies, of Treborth, who has acted as treasurer of the Puffin Island station since 1892, has led off with a handsome subscription.

WITH respect to the recent coloured sunsets that have been and are being seen in this country, it is interesting to note that similar phenomena are being observed in Germany. Thus the Berlin correspondent of the *Standard* writes (July 7):—"For some time past, both at sunrise and towards dusk, there has been visible here a remarkable glow of colour on the horizon, the sky exhibiting an appearance of unusual beauty. Men of science put forth the theory that this phenomenon is caused by particles in the air emanating from the fiery mass ejected by Mont Pelée." The coloured sunsets referred to last week (pp. 222, 230) were noticed at Lewisham on the evening of June 26. Mr. R. McLachlan, F.R.S., writes to say that when facing nearly due east his attention was attracted by a peculiar tint in the sky. On proceeding to the front of the house the effect was extremely brilliant, the red predominating. Mr. McLachlan thinks the tint in the eastern sky was probably due to reflection. Mr. A. R. Tankard writes to confirm the observations of remarkable sunsets at Madeira, described by Mr. F. W. T. Krohn in NATURE of June 26. He says that the peculiar sunset effects were not visible in the district of the Canary Isles and Madeira during April. As the chief eruptions in Martinique and St. Vincent took place in the first two weeks of May, and the curious effects described made their appearance subsequently, namely, in the early days of June, their connection with the eruptions is rendered probable.

A NOTE in a recent number of the *British Journal of Photography* (July 4) gives a brief account of a balloon voyage of a very uncomfortable nature that was made by Dr. Miethe in company with Lieutenant Hildebrandt. The account, which is taken from the *Photographisches Wochenblatt*, states that the ascent was made at Tegel in the afternoon at three o'clock, and the balloon came to earth at half-past six between Nieder-Finow and Liepe. At the ascent the balloon passed first through a mist, and then suddenly into a thunder cloud. After attaining a height of 200 metres, the balloon was suddenly carried to an altitude of 2000 metres, and then as suddenly fell half that distance. Meanwhile the storm was proceeding, but although the travellers did not see the lightning they were deafened with the thunder, and pelted with rain, hail and sleet. In their rapid leaps and plunges the car was frequently on a level with the balloon, and the tow-rope above their heads. The violent rocking of the car also added to the danger. Watches were not thought of, but according to the barograph this frightful experience must have lasted half-an-hour, when, through loss of gas by pressure, the balloon fell from a height of 2200 metres upon a dense wood of beeches, but for which the travellers would probably have lost their lives. One of them descended by the rope, and obtained help from the villagers at Liepe.

WE have to record the death by drowning, on Tuesday, July 1, of Mr. A. D. Hogg, a student of the Royal College of Science, London. Mr. Hogg, who had been a botanical assistant to Prof. Bayley Balfour in the University of Edinburgh, his native place, came to London and the Royal College of Science as a National Scholar in the autumn of 1901. Having obtained high qualification in botany, zoology and geology, he recently proceeded to St. Andrew's, at the suggestion of Prof. Howes, to study under Prof. McIntosh, in preparation for his return to South Kensington and zoology in the coming autumn. On the evening of his first day in the Gatty Marine Laboratory, seeking quietude and respite from the western sands, which were crowded at the time, he wandered to the mouth of the river to bathe. Not knowing the dangers of the spot, he swam out and was overcome, and in his loss science has become the poorer by an earnest and promising student.

REPORTS from Vienna, published in the *Daily Mail*, state that a severe earthquake lasting twenty seconds occurred at Salonica at 4.20 p.m. on Saturday, July 5. Before the news reached Vienna the instruments at the Laibach Seismological Observatory registered a great disturbance towards the south-east at an estimated distance of 600 miles. Later telegrams state that the earthquake was felt right across the Balkan peninsula. The shocks began on Saturday afternoon, and continued with frequent intervals until midday on Monday. A very cold wind is said to have accompanied the earthquake. More than 200 houses were wrecked at the village of Bani, three miles from Salonica.

IT is reported that two slight shocks of earthquake occurred in the neighbourhood of Cheadle, Cheshire, on July 8.

WE regret to learn of the death of the Abbé Maze, on June 17, at the age of sixty-six years. He had been for many years one of the editors of our contemporary, *Cosmos*; his first connection with that journal was as meteorologist after the Franco-Prussian War of 1870-1, and he was for some time secretary of the French Meteorological Society. About twenty years ago he undertook a laborious investigation into the periodicity of rainfall, which he has left uncompleted; it is said that he had established a double period of 6, and 6 × 7, or 42 years, for the recurrence of similar general phenomena. He was also engaged for many years on a history of the thermometer, and has left in manuscript a large amount of valuable information upon this subject, collected from every available source, and which we hope will eventually be brought to light.

THE *Morning*, the auxiliary ship of the National Antarctic Expedition, sailed yesterday for Lyttelton, New Zealand, *en route* to the Antarctic regions, where it is intended to meet the *Discovery* with supplies, and to render any other services which may be required. From an article in the *Times* we learn that while the main object of the *Morning* is to act as tender to the *Discovery*, still she is well equipped with scientific instruments of various kinds, some of which have been supplied by the Admiralty, including survey instruments, a large photographic equipment, sounding gear, and apparatus for collecting at least the surface fauna of the ocean. Constant meteorological observations will be taken, and in other respects as far as possible the staff on board the *Morning* will do its best to supplement the work of the *Discovery*. The captain of the *Morning* and commander of the relief expedition is Mr. William Colbeck, who was one of the staff of the *Southern Cross* Antarctic Expedition, on which he took the observations and drew the charts.

ACCORDING to a recent paragraph in the *Times*, the arrangements for the Scottish National Antarctic Expedition, under the leadership of Mr. W. S. Bruce, are making satisfactory progress. The Norwegian whaler *Hekla*, which Mr. Bruce recently purchased for the expedition, is to be renamed the *Scotia*. The ship is now being reconstructed on the Clyde, at Troon, by the Ailsa Shipbuilding Company, under the guidance of Mr. G. L. Watson, the well-known yacht designer. The *Scotia* is a barque-rigged auxiliary screw steamer of about 400 tons register. New deckhouses are being built, a larger one aft and a smaller one forward divided into a laboratory and cook's galley. A second laboratory and dark room is to be fitted between decks. The ship is being specially fitted to carry on oceanographical research, both physical and biological. Two drums, each containing 6000 fathoms of cable, for trawling in the deepest parts of the Southern and Antarctic Oceans, are being taken. Mr. Bruce intends to follow the track of Weddell and to explore the Ross deep, working eastwards from the Falkland Islands.

A NUMBER of papers dealing with various aspects of the recent eruptions in the West Indies appear in the current issues of the geographical and other scientific journals. A short article on "Martinique und sein Vulkanismus," in the June number of *Petermann's Mitteilungen*, by Dr. Emil Deckert, is accompanied by an excellent map of the island. Dr. Michel-Levy, director of the geological survey of France, contributes a paper on the Mont Pelée eruptions, with some admirable geomorphological diagrams, to the *Revue générale des Sciences*. In the *Geographical Journal* for July Mr. E. André describes a visit to St. Vincent, and some excellent photographs are reproduced, while Mr. H. N. Dickson gives a narrative of events, advancing the view that the destruction of St. Pierre was caused by a tornado originating in the hot gases issuing from the crater of Mont Pelée. A paper on the Windward Isles, by Dr. J. W. Spencer, appears opportunely in the *Transactions* of the Canadian Institute; it is illustrated by a number of plates and six valuable charts showing the contour of the sea-bottom.

THE fate of M. Andrée is still a subject of speculation. A Reuter telegram from Winnipeg states that the Rev. Mr. Fairies, an Anglican missionary among the Eskimos within the Arctic Circle, has arrived there and repeats the story, which was brought two years ago by an Eskimo to Port Churchill, that a band of natives found M. Andrée and party 300 miles to the north of Port Churchill. On approaching them M. Andrée fired a gun. The natives interpreted this as a hostile act and set upon the explorers and killed them. The Hudson Bay Company offered a large reward to the messenger to bring some relic. He departed, but never returned. Mr. Fairies described an instrument resembling a telescope, which was taken from the outfit and carried with other loot to the Arctic Circle by the Eskimos.

THE seventeenth annual meeting of the Photographic Convention of Great Britain was opened at Cambridge on Monday, when Sir Robert Ball, the new president, delivered an address on astronomical photography.

THE Brazilian Minister and the staff of the Brazilian Legation will attend the meeting of the Aëronautical Society to be held on Thursday next, July 17. The following papers will be read:—"The 'Peace' Balloon of the late Senhor Augusto Severo," by Dr. Carlos Sampaio and Mr. Eric Stuart Bruce; "Balloon Ascents in Thunderstorms," by the Rev. J. M. Bacon; "A Performance of the Bristol War Balloon during the South African War," by Captain H. B. Jones, R.E.; and "The Cycala Flying Machine," by Dr. Charles Zimmerman.

THE Sydney correspondent of the *Daily Mail* reports that the drought has become intensified in Queensland and in parts of New South Wales, while there has been rain elsewhere. The New South Wales rainfall for June on the coast to the south of Sydney is 95 per cent. below the average of the corresponding month in past years. In the immediate neighbourhood of Sydney the deficiency is 91 per cent., on the Hunter River 85 per cent., on the North Coast 93 per cent., on the Darling River 84 per cent., and between the Darling, the Lachlan and the Bogan Rivers 87 per cent.

A FEW examples of the practical application of scientific education in Germany are given in the *Journal* of the Society of Arts. The sugar industry is the first illustration of the progress of industry through science. In 1840, 154,000 tons of beetroot were crushed, from which 8000 tons of raw sugar were produced, showing about 5½ per cent. of raw sugar extracted from the root. Twenty years later, 1,500,000 tons were treated, which produced 128,000 tons of sugar, or about 8 per cent. Last year about 12,000,000 tons were crushed, which produced 1,500,000 tons of raw sugar, raising the percentage to 13. This advance is due entirely to scientific treatment. The production of dry colours, chemicals and dyes in Germany shows a corresponding increase in production and dividend-paying capacity. The great increase of earning capacity is due largely to the constant labour of trained men, who by application of their technical knowledge have so cheapened production that they have succeeded in getting this trade out of the hands which previously controlled it. A great advance has also been made in the scientific instrument industry. The value of the exports from Germany of scientific instruments in the year 1898 was about 250,000*l.*—three times what it was in 1888—and the work gave employment to 14,000 people. These are a few of the many instances showing the close connection between the scientific education of the German people and their commercial prosperity.

THE United States Weather Bureau has just issued a paper by Prof. Alfred J. Henry on wind velocity and fluctuations of water level on Lake Erie. Continuous automatic records of the variations of level at Amherstburg and Buffalo for December, 1899, to November, 1900, are correlated with wind records at Buffalo for the same period, and the material applied to analysis of seiches of different types, including the "fair weather" seiches and those accompanying storms. The period of the smaller seiches is about fourteen hours, that of the larger about sixteen hours. The occurrence of a severe seiche at Buffalo cannot be foretold many hours in advance, but sufficient time could generally be given to warn property interests along the wharves.

THE report of the Californian section of the climate and crop service of the Weather Bureau, for April, contains an interesting note on a statement in the article on Francis Drake in the "Dictionary of National Biography." Referring to the position of Drake's anchorage near the Golden Gate in June, 1579, the article says:—"The one doubtful point is the account of the climate, which is described with much detail as excessively cold and foggy. (Vaux, pp. 113-118). This is now said to be an exaggeration, but to speak of the climate near San Francisco or anywhere on that coast in July in these terms is not exaggeration, but a positive and evidently wilful falsehood (Greenhow, 'History of Oregon and California,' 1845), credulously inserted by the original compiler of the 'World Encompassed.'" The Weather Bureau station at Point Reyes Light, probably not more than three miles from Drake's anchorage, amply confirms the correctness of Drake's description. Fog is specially prevalent during the months June, July and August, and it is generally accompanied by strong north-westerly winds, often reaching a velocity of fifty miles an hour; a comparison of the records with those from the stations at San Francisco and on Mount Tamalpais shows an astonishing contrast as regards temperature, relative humidity and duration of sunshine. Prof. George Davidson, who was in charge of the work of the Coast Survey in this region, and has published a paper on the "Identification of Sir Francis Drake's Anchorage on the Coast of California," says "that from July 2, 1859, the fog hung over the promontory of Point Reyes for thirty-nine consecutive days and nights."

IN an article in NATURE of April 18, 1901, attention was directed to the commercial uses made of peat in Sweden, where it is coming largely into use as a substitute for coal for steam engines. In a recent number of the *Engineer* (June 27) an account is given, with illustrations, of the peat fuel works at Stangfiorden, in Norway, where electricity generated by water power has been in use since 1898 for the manufacture of peat for fuel, which is of the more interest because it is reported that negotiations are now in progress for the introduction of this system for the development of one of the water powers on the west coast of Ireland. So far peat fuel and moss litter are the only two products that have been obtained from a very limited number out of the numerous peat bogs to be found in this and other countries. The chief difficulty in manufacturing peat fuel is the extraction of the water, which comprises about 85 per cent. of the whole bulk, and which must be removed before the remaining carbonaceous matter can be rendered available for fuel. At Stangfiorden the wet peat is brought direct from the bog to the factory in boats of 100 tons capacity; the material is removed from these by electric agency and submitted to a preliminary operation of drying and pressing. The briquettes thus formed are then transported on small iron trolleys with shelves to the interior of the drying chamber. Warm air is driven through this by electric fans. From the drying chamber the blocks are taken on the same trolley to the retorts, where they are packed round spiral resistance coils and the electric heating agent set in operation. The peat yields—besides the fuel briquettes, which form 33 per cent. of the whole—tar, charcoal, creosote, sulphate of ammonia and other bye-products. The electric power is derived from five 80-kilowatt dynamos coupled direct to five turbines of 128 H.P. The plant is capable of turning out 1000 centners of air-dried peat a day. The fuel burns well, yields little soot or ash, and is readily disposed of in Bergen and other towns.

FROM a paper communicated by Prof. Höfer to the Vienna Academy of Sciences it appears that spring waters from a large number of different petroleum districts either contain no sulphates or at most a minimal quantity of these salts. Under the influence of the petroleum and marsh gas, the sulphates have probably undergone reduction. It is pointed out that the absence of sulphuric acid in waters from petroleum provinces may be advantageously made use of in a practical way for ascertaining the whereabouts of petroleum deposits or inversely for determining the source of the waters in question.

MESSRS. SANDERS AND CROWHURST have sent us a catalogue of the photographic apparatus which is made and sold by them. The list contains almost everything that a photographer can desire; many useful novelties are included.

MESSRS. A. W. PENROSE AND CO. are making Mr. Alex. Tallent's diffraction spectroscope camera, an account of which instrument is given in a small pamphlet published by Messrs. Penrose. The main feature of this camera is that we have in a small compass a light, compact, handy and inexpensive spectroscope, ready for use at any moment. Such an instrument is rendered possible only by the introduction of the Thorp diffraction prism-grating, which does away with the necessity of a train of prisms to obtain large dispersion and what is also an important item, the outlay of considerable expense. The compactness of the instrument is due chiefly to the fact that the prism-grating forms a direct vision system. The instrument, a full account of which is given in the pamphlet, only costs from forty-five to sixty-three shillings, according to the requirements of the user, and will be found very serviceable in many directions, such as the composition of various light sources, colour sensitiveness of plates, examination of dark-room filters, &c. The plate which accompanies the text describes better than words the different uses to which the instrument can be applied, and the scale on which the spectra are obtained.

A COMPARATIVE study of the permeability of living and dead animal membranes by measurement of the electrolytic resistance has recently been made by Mr. G. Galeotti, and the results are published in *Lo Sperimentali, Archivio di Biologia norm. e patol.*, vol. lvi. The living membranes were first investigated, and then after remaining in chloroform vapour for some time were again placed in the electrolytic cell and the resistance of the solution measured as before. Various salt solutions were employed, the strengths of these being in the majority of cases one-tenth normal. The author finds that the resistance of membranes, which in the animal body separate solutions of different nature and concentration from one another, is ten to forty times greater in the living condition than when the membranes are dead. The resistance of membranes, which have no functions of this character in the animal system, is, on the other hand, unaltered by the action of chloroform vapour. The conclusion is drawn that membranes of the first class, for example, from the cæcum of the rabbit and the bladder of the turtle, behave as semipermeable membranes in the living condition, but this semipermeability is lost when the cells are dead. Membranes of the second class, on the other hand, act simply as diffusion membranes, and the permeability of these is the same whether living or dead.

ALTHOUGH the question as to whether the nitrogen of the albuminates present in the animal body is partly set free in the form of free gaseous nitrogen has been experimentally studied on several occasions, yet the conclusions drawn by different investigators working under different conditions are by no means concordant. The first series of such investigations was carried out by Regnault and Reiset, who found, in the great majority of their experiments, a considerable increase in the quantity of nitrogen in the respired air. About one hundred experiments were made and animals of totally different classes were subjected to investigation. Seegen and Nowak, with an improved apparatus which permitted of the experiments being continued over much longer periods of time, obtained results which agreed with those of the first observers. Hans Leo, working under different conditions, concluded, on the other hand, that nitrogen, as a product of the decomposition of albuminates, is not set free from the animal system. In Leo's latest experiments, the bodies of the animals under investigation were immersed in water, and under these conditions it was found that the alteration in the amount of nitrogen of the air was scarcely perceptible. To promote the further investigation of this subject, Prof. J. Seegen has placed 6000 kronen at the disposal of the Vienna Academy of Sciences, which sum is offered by the Academy as a prize for the solution of the question. The formulation of the problem reads:—"Es ist festzustellen, ob ein Bruchtheil des Stickstoffes der im thierischen Körper umgesetzten Albuminate als freier Stickstoff in Gasform, sei es durch die Lunge, sei es durch die Haut ausgeschieden wird." Papers sent in for competition are to be written in German, French or English, and should be sent to the office of the Academy before February 1, 1904.

THE *American Naturalist* for June contains an article, by Mr. W. R. Coe, on some Nemertean worms parasitically infesting certain crabs, in the course of which the new genus Carcinomertes is described.

MODERN refinements of description render it of the utmost importance that skins of small mammals should be made up on one uniform plan. Mr. G. S. Miller has accordingly published in the *Bulletins* of the U.S. Museum a revised edition of directions for making such preparations, with abstracts in German, French and Spanish.

AMONG other articles, part 4 of vol. lxxi. of the *Zeitschrift für wissenschaftliche Zoologie* contains one by Dr. K. Escherich on the development of the nervous system in flies, and a second, by Prof. P. Bachmetjew, on the effects of heat on the development of the pupæ of butterflies and moths. The nerves of the skin form the subject of a third communication, by Dr. Tretjakoff.

THE thoroughness of American methods is well exemplified in a review of the horned larks (Otocoris), by Mr. H. C. Oberholser, forming No. 1271 of the *Proceedings* of the U.S. Museum. In addition to four maps illustrating the distribution and breeding areas of these larks, this memoir contains photographs showing the different kinds of country inhabited by the various local races of certain species. These birds vary so much according to environment that their classification and identification are the despair of the systematist. The manner and degree of this variation—and not the mere identification of specimens—should be the aim of the investigator.

IN the June issue of the *American Naturalist* Mr. J. F. McClendon describes the life-history of the insect commonly known as *Ulula hyalina*, a near relative of the so-called ant-lion of Europe. The larva "hides in some slight depression or under the edge of a stone, with its body covered with sand and its mandibles widely extended so as to touch the fringe of hairs on each side of the head. Its brown colour simulates the colour of the sand. Its body is hidden by the covering of sand, and the head is somewhat concealed by its peculiar covering of hairs, so that small insects may crawl, unawares, too near the extended mandibles. In this case the larva thrusts out its head and snaps the mandibles together, pinioning the victim on the curved points. It then proceeds to suck out the juices of its prey like an ant-lion."

AN appendix to the twentieth annual *Report* of the Scotch Fishery Board contains notes on the digestive tract of salmon and sea-trout kelts from the Tweed by Mr. J. K. Barton, illustrated with some beautiful reproductions from photographs of microscopic preparations. The author is of opinion that sea-trout continue to feed to within a shorter interval of their entering fresh-water than is the case with salmon, although when in the rivers both fishes are equally abstemious. No trace of the desquamative catarrh of the mucous coat which has been supposed to characterise the intestines of river fish was observed. It must be left for subsequent examinations to determine whether salmon-disease is due to the fungus Saprolegnia, or whether the presence of that fungus is merely the precursor of death owing to other diseased conditions.

MUCH interest attaches to an article in the *American Naturalist* for June on aggregated colonies in madreporiform corals, by Dr. J. E. Duerden. The fact that coral larvæ will occasionally attach themselves to the cups of adult corals of the same species has been noticed by previous observers. The author finds, however, that in certain West Indian corals an analogous process is quite a common method of formation of composite corals, the larvæ of Siderastræa frequently fixing themselves close together in small groups upon some convenient base. In course of time they grow together to form a colony, which thus differs from an ordinary colony in consisting of several individuals. Such an aggregate colony may be distinguished, for a time at least, from one of the ordinary type, by the fact that the component items are not in communication at the base.

THE search for the missing link forms the subject of an article, by Mr. R. S. Baker, in this month's *Idler*, mainly based on the discovery of "Pithecanthropus" and Prof. Haeckel's expedition to Java in search of further remains of that mysterious creature. The author traces the gradual "evolution" of the conception of the origin of one group of animals from another, and illustrates his subject with excellent portraits of Darwin, Haeckel, Huxley and Wallace. We are afraid that the illustrated table of man's descent will be apt to prove a stumbling-block to the uninitiated, and that the gorilla, gibbon, opossum, iguana, &c., will be regarded as among man's direct ancestors. The inclusion of marsupials in man's genealogical tree is, we fear, an error which it will take some time to eradicate from popular writings. The author would have done well to have shown his proof to some zoological friend, which would have resulted in the elimination of the sentence as to the association of Pithecanthropus with *the* elephant, rhinoceros, hyæna, &c. What may be the animal designated in the same sentence as "the gigantic pangolin" we are at a loss to conceive.

A BRIEF summary of progress in archæological and ethnological research in the United States during last year is given by Prof. F. W. Putnam in a reprint from vol. xiv. of the *Proceedings* of the American Antiquarian Society (1901, pp. 461–470). Since the paper was read at the annual meeting of the Society in October 1901, the Carnegie Institute has been founded at Washington, and the broad spirit in which it has been organised gives satisfaction to all who are anxious to extend the boundaries of scientific knowledge. Referring to the Institute, Prof. Putnam remarks: "The scope of this foundation embraces all the sciences, and its purpose is the encouragement and patronage of research. Such an institution will have the power to render incalculable service to American archæology and ethnology, where so much needs to be done without loss of time."

WE have received the first two numbers of a series of occasional reports on the agriculture and forest culture of German East Africa, issued by the Central Government at Dar-es-Salam, and published by Carl Winter at Heidelberg. These reports, which are to be continued as occasion requires, contain the results of valuable scientific investigations by officials, dealing with such matters as the tse-tse fly, analyses of soils, climatology, &c. Extracts of reports from numerous civil and military stations are given, and accounts of exploring journeys into less-known regions of the colony.

THE current issue of the *British Medical Journal* (July 5) is a special vaccination number, and contains several interesting contributions on Jenner's life and works, and on small-pox and vaccination. Much valuable material—scientific, clinical and administrative—connected with the disease and its remedy, is described by writers of recognised authority.

MESSRS. DUCKWORTH AND CO. will publish immediately a book on "European Fungus-Flora," by Mr. George Massee, principal assistant at the Royal Herbarium, Kew. The work will be a synopsis of the European Agaricaceæ, giving the specific characteristics of 2750 European species, of which 1553 are British.

MESSRS. DAWBARN AND WARD have commenced the publication of a series of practical handbooks designed to be of service to dwellers in the country. The first book of the series, on "Outdoor Carpentry," by Mr. S. Walter Newcomb, gives brief instructions, with plans, sketches and details, for constructing rustic work of many kinds. Among the subjects of future volumes will be water-supply and distribution, sanitation and drainage, and planning gardens, grounds and outbuildings.

THE *English Illustrated Magazine* for July contains an article upon the supposed portrait of Christ on the Holy Shroud of Turin, translated from the French, and based upon Dr. Vignon's work on "Le Linceul du Christ." The article leaves the question whether the markings upon the shroud were really produced by the body of Christ undecided, but it is held that there is sufficient evidence for the belief that the image was naturally imprinted upon the shroud by the action of vapours arising from a human body. Another article in the magazine, by Mr. J. J. Ward, gives an instructive illustrated account of May-flies and related insects.

THE "Technolexicon," or technical dictionary, to be published by the Society of German Engineers, has previously been referred to in these columns. The editor, Dr. Hubert Jansen, Berlin (N.W. 7), Dorotheenstr. 49, is anxious to include in the dictionary all technical terms used by French, German and English engineers, so that the dictionary shall contain equivalent words and expressions in each of the three languages. Collaboration is invited from societies, individuals and engineering works. The editor would be glad to receive technical catalogues, price lists, hand-books, or lists of words and terms for which correct renderings cannot be found in ordinary dictionaries. The work will be so useful when ready that all who are able to contribute to its completeness should do so.

THE additions to the Zoological Society's Gardens during the past week include two White-eared Conures (*Pyrrhura leucotis*) from Brazil, presented by Lady Lindsay; two Peregrine Falcons (*Falco peregrinus*), European, presented by Dr. R. Lawton Roberts; a European Pond Tortoise (*Emys orbicularis*), European, presented by the Earl of Dudley; a Common Viper (*Vipera berus*), British, presented by Mr. E. Ball; two Snowy Egrets (*Ardea candidissima*) from America, two Vinaceous Amazons (*Chrysotis vinacea*), two Red-tailed Amazons (*Chrysotis brasiliensis*) from Brazil, seven Roofed Terrapins (*Kachuga tectum*) from India, a Black Sternothere (*Sternothoerus niger*) from West Africa, a Wrinkled Terrapin (*Chrysemys scripta rugosa*) from the West Indies, a Blue-tongued Lizard (*Tiliqua scincoides*) from Australia, a Madagascar Tree Boa (*Corallus madagascariensis*) from Madagascar, deposited; a Proboscis Monkey (*Nasalis larvatus*) from Borneo, two White Storks (*Ciconia alba*), European, purchased.

OUR ASTRONOMICAL COLUMN.

THE PERIODICAL COMET OF TEMPEL-SWIFT (1869–1880).—This object is one of the most interesting of the somewhat numerous class of comets which at aphelion pass just outside the orbit of Jupiter and perform their revolutions in periods ranging from about 5 to 9 years. First seen by Tempel in 1869 November 27, the character of the orbit was not determined until its independent discovery by Lewis Swift in 1880 October 10. It was then found to be moving in an orbit of short period for the elements deduced by Bruhns, for the apparition of 1869 very closely resembled those obtained by Chandler for the return of 1880, and the latter pointed out the true character of the orbit early in 1880 November. Messrs. Schulhof and Bossert, of Paris, also published elements indicating a periodic time of 5½ years.

The average period for the four returns which occurred between 1869 and 1891 was 2009 days, or 5 years and 183 days. At every alternate return, however, the comet is invisible. The perihelion is reached at a distance of about 10,000,000 miles outside the earth's orbit, and the three previously observed perihelion passages having occurred between November 6 and 18, the conditions were extremely favourable, the longitude of the comet's perihelion being 43° and the longitude of the earth on November 6 being 43°. The comet and earth were, in fact, mutually situated in or near those parts of their orbits which make the nearest approach to each other. At alternate returns such as in 1875, 1886, 1897, 1908 and 1919, the earth is on the opposite side of the sun to the comet when the latter passes through perihelion. In such circumstances the object is altogether beyond reach, for at one of these unfavourable returns it is placed nearly 200,000,000 miles from the earth, whereas under the best conditions, similar to those which prevailed during the apparition in 1880, the distance may be less than one-tenth of that mentioned.

As in 1869, 1880 and 1891, so in 1902, the comet will be very favourably visible in the autumn and winter months, and it will probably be re-detected in one of our large telescopes in about September next. The object will be by no means conspicuous, nor is it likely to display any attractive variety of aspect, but any moderately good telescope will show it as a large faint nebulosity. One of the best known of the ever-increasing group of Jovian comets, it will be sure to attract considerable attention during its forthcoming return, not so much, perhaps, on account of its visible characteristics as from the example it affords of a numerous class of bodies and from the interesting history attached to its previous appearances.

MR. TEBBUTT'S OBSERVATORY AT WINDSOR, N.S.W.—The annual report of this observatory for 1901 shows that much useful work was done last year. Measures of the positions of Venus, Ceres, Parthenope, Melpomene and Diana were made and the results forwarded to the *Astronomische Nachrichten* (Band clvi. p. 105).

Under "Comet Observations" we find that 273 determinations of the position of Comet I. 1901 were made between May 3 and June 13, 1901, and the full results were published in the *Astronomische Nachrichten* (Band clvi. p. 95 and Band clvii. p. 187). Encke's comet was fruitlessly sought on the evenings of October 2 and 8.

During twenty evenings the measures of twenty-eight double stars were made and the results published in the *Monthly Notices* R.A.S. (vol. lxi. p. 51).

The tables of meteorological observations show a temperature above, and a rainfall below the average, the year 1901 being the driest year recorded (excepting 1888) since 1862.